

SODA ASH

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Soda ash, which is also known as sodium carbonate (Na_2CO_3), is an alkali chemical refined from the mineral trona or naturally occurring sodium carbonate-bearing brines, both of which are referred to as “natural soda ash,” and the mineral nahcolite, which is referred to as “natural sodium bicarbonate,” from which soda ash can be produced, or manufactured from one of several chemical processes, which is referred to as “synthetic soda ash.”

Despite the fact that most people have never heard of soda ash, it is an important industrial compound used to manufacture, in declining order of tonnage, glass, chemicals, soaps and detergents, pulp and paper, and many other familiar consumer products. The United States is the world’s largest soda ash-producing nation with the world’s largest natural deposit of trona. U.S. natural soda ash is extremely competitive in world markets because the majority of the world output of soda ash is made synthetically, which is usually a more expensive process.

Production

Soda ash production and inventory data were collected by the U.S. Geological Survey (USGS) from monthly, quarterly, and annual voluntary surveys of the U.S. soda ash industry. A survey request was sent to each of the six soda ash companies, all of which responded; their responses represent 100% of the total production data in this report (table 1). The information and data are fundamental resources for analysis, within and outside the Government. The soda ash data and information are used by the public and private sectors to better improve the understanding of minerals and materials usage, the ultimate disposition of materials in the economy and in the environment, and to develop public and private sector policies and practices that better use domestic mineral and material resources. Soda ash data and information are used by financial institutions, State and Federal agencies, soda ash-consuming industries (for example, glass, chemicals, detergents), educational institutions, and the general public.

For the first time in about 100 years, the United States lost its position as the world’s leading soda ash-producing nation. China overtook the United States in 2003, and may continue to be the world’s leader for the foreseeable future. U.S. production of natural soda ash from California, Colorado, and Wyoming in 2003 was 10.6 million metric tons (Mt), which was slightly higher than that of 2002. On the basis of about 14.5 Mt (16 million short tons) of total nameplate capacity, the U.S. soda ash industry operated at 73% of total capacity. This capacity utilization rate appears low because it includes the full nameplate capacity of 900,000 metric tons (t) (1 million short tons) for American Soda, L.L.P., which intentionally operated at only half-capacity during the year but was included in the industry total because nameplate capacity is based on the industry total as of December 31 of each year. In addition, the low capacity utilization rate resulted from idle capacity at FMC Wyoming Corp. and OCI Chemical Corp. of 1.18 Mt (1.3 million short tons) and 816,000 t (900,000 short tons), respectively. Approximately 2 Mt (2.2 million short tons) of nameplate capacity, which represented about 14% of total industry nameplate capacity, was idle in 2003. This available capacity could be brought back online when market conditions improve.

The U.S. soda ash industry consisted of six companies in 2003—four in Wyoming operated four plants that produced soda ash from underground trona ore, one in California produced soda ash from sodium carbonate-rich brines, and one in Colorado produced soda ash and sodium bicarbonate from solution mining underground nahcolite; nahcolite is a mineral that is naturally occurring sodium bicarbonate; its name is derived from the chemical elements contained in sodium bicarbonate—Na (sodium), H (hydrogen), C (carbon), O (oxygen), and “lite” (stone). FMC’s Granger, WY, plant was idle in 2003.

In September, Solvay America, Inc., which was the U.S. holding company for most of the North American subsidiaries of Solvay S.A. of Belgium, combined its U.S. chemical operations (Solvay Minerals, Inc., Solvay Interlox, and Solvay Fluorides) into Solvay Chemicals, Inc. (Solvay Chemicals, 2003¹). On September 10, Solvay America acquired American Soda’s natural soda ash facility in Colorado from The Williams Companies, Inc. The sale included the fleet of railcars, which are 10% larger than those used by soda ash producers in Wyoming. The plant had a nameplate capacity of 907,000 tons per year (t/yr) (1 million short tons) of soda ash and 136,000 t/yr (150,000 short tons) of sodium bicarbonate. At yearend, Solvay Chemicals was still evaluating the viability of the operation (Chemical Market Reporter, 2003b).

IMC Chemicals, Inc. sold its White River Nahcolite Minerals LLC sodium bicarbonate operation in northwestern Colorado to Natural Soda, Inc. (formerly Natural Soda AALA, Inc., a wholly owned subsidiary of AmerAlia, Inc.). The purchase price was \$20.6 million in cash for the plant that has a capacity of 90,700 t/yr (100,000 short tons). The majority shareholder (53%) in AmerAlia was the Jacqueline Badger Mars Trust, one of the heirs to the Mars, Inc. confectionery business. White River began solution mining nahcolite ore in 1991 (Industrial Minerals, 2003a).

¹References that include a section mark (§) are found in the Internet References Cited section.

Consumption

The USGS collects soda ash consumption data by end use on a quarterly basis from the marketing and sales departments of each company. Every effort has been made to categorize company sales within the correct end-use sector. Quarterly reports are often revised in subsequent quarters because of customer reclassifications or other factors. All U.S. soda ash companies responded to the quarterly surveys for end-use consumption; data represented 100% of the total reported consumption data found in this report.

In 2003, U.S. apparent consumption of soda ash was 6.09 Mt, and reported consumption was 6.27 Mt (table 1). Reported consumption and apparent consumption do not necessarily correspond because reported consumption is actual sales, whereas apparent consumption is the calculated quantity available for domestic consumption based on balancing supply (production, imports, and inventory adjustments) with external demand (exports).

In 2003, U.S. apparent consumption and reported consumption varied by 180,000 t, which was about 3% of apparent consumption. The discrepancy between the two forms of consumption was attributed to the difference between the two sources of export data used to derive consumption statistics. These two sources were the U.S. Census Bureau, which reports exports upon departure from U.S. ports, and the soda ash producers, which consider a shipment to be exported when their export association, the American Natural Soda Ash Corp. (ANSAC), takes consignment of the product at the California, Colorado, or Wyoming plant sites. Transit times between the plant and port, which can take about 2 to 3 weeks before the cargo is actually exported, and carryover export inventories also contribute to the discrepancy between reported and apparent consumption as well.

In the domestic market, large-volume buyers of soda ash were primarily the major glass container manufacturers whose purchases were seasonal; more beverage containers made in the second and third quarters for summertime beverage consumption. Soda ash sales to the flat glass sector were usually dependent on the state of the economy because the largest uses of flat glass were in automobile manufacture and in residential housing and commercial building construction. These two major industrial sectors were especially sensitive to changing economic conditions, and soda ash sales followed the trends in the two sectors. The distribution of soda ash, by end use, in 2003 was glass, 49%; chemicals, 28%; soap and detergents, 11%; distributors, 4%; miscellaneous uses, 3%; flue gas desulfurization and pulp and paper, 2% each; and water treatment, 1%.

Glass.—Glass manufacture represented about 49% of domestic soda ash consumption—the container sector accounted for 51%; flat, 34%; fiber, 9%; and specialty, 6%. Glass containers were made for beverages (beer, carbonated, and noncarbonated drinks), chemical and household products, food, liquor, medical products, and toiletries and cosmetics.

Owens-Illinois, Inc. announced plans to build a new glass-container-manufacturing facility near Windsor, CO (Owens-Illinois, 2003§). It will supply beer bottles for the Anheuser-Busch brewery in nearby Ft. Collins. When in full operation by the end of the second quarter 2005, the plant will have the capability to manufacture more than 1 billion bottles per year. With 68 plants worldwide, Owens-Illinois was the largest glass container manufacturer in North America (25 plants in the United States), South America, Australia, and New Zealand, and one of the largest in Europe (Trona Patch Times, 2003b).

Chemicals.—Soda ash is used to manufacture many sodium-based inorganic chemicals; these include sodium bicarbonate, sodium chromates, sodium phosphates, and sodium silicates.

Soaps and Detergents.—Detergents were the third largest use of soda ash. Soda ash was used as a builder to emulsify oil stains, to reduce the redeposition of dirt during washing and rinsing, to provide alkalinity for cleaning, and to soften laundry water. In addition, soda ash was a component of sodium tripolyphosphate (STPP), which is another major builder in detergent formulations. Soda ash consumption has been decreasing because phosphatic detergents can contribute to eutrophication, which is an environmental concern. Many regions of the Nation adopted phosphate limitations or bans, which affected about 40% of the U.S. population. A strong U.S. economy boosted demand for industrial and institutional cleaners and automatic dishwashing detergents during the past several years. New technology that uses enzymes in dishwashing detergents and a move toward liquid cleansers, however, may adversely affect STPP consumption in the future.

In response to the environmental concern that cardboard detergent packaging contributes to the volume of landfill waste, detergent manufacturers changed formulations to make compact and superconcentrated products. These reformulations required the use of sodium silicates and synthetic zeolites, which are made from soda ash. Liquid detergents, which do not contain any soda ash, competed with powdered detergents and commanded about 50% of the household laundry detergent market in 2003.

Stocks

Yearend 2003 stocks of dense soda ash in domestic plant silos, terminals, and warehouses, and on teamtracks amounted to 330,000 t. Producers indicated that a potential supply problem could exist if inventories fell below 180,000 t. Most consumers of soda ash did not have the storage facilities to accommodate large quantities of soda ash and had to rely on suppliers to provide the material on a timely basis.

Prices

The average annual value for bulk, dense natural soda ash, free-on-board (f.o.b.) Green River, WY, Searles Valley, CA, and Parachute, CO, was \$71.88 per metric ton (\$65.21 per short ton), which was less than that of 2002. The value is not a “price,” but rather the value of the combined revenue of California, Colorado, and Wyoming bulk, dense soda ash sold on an f.o.b. plant basis at list, spot, or discount prices, on long-term contracts, and for export, divided by the quantity of soda ash sold. Only merchant soda ash

is used to derive the annual value; therefore, no soda ash for value-added products or soda liquors is included. The list prices quoted in trade journals or by producers differed from the annual average values reported to and by the USGS. This value may or may not correspond to the posted list prices. The list price for Wyoming bulk, dense soda ash has not changed since it was raised effective on July 1, 1995, or as contracts permit, to \$105 per short ton from \$98 per short ton. The California price for the comparable product also increased in 1995 by \$7 per short ton, to \$130 per short ton from \$123 per ton (table 4).

The price increase initiatives in late 2002 were not entirely successful because some of the producers had contracts with some customers that had set prices. In September 2003, the industry again announced a \$7-per-short-ton increase on its off-list prices on all grades of bulk and bagged soda ash, not to exceed the current list price effective immediately or as contracts permit. The rising cost of energy, particularly natural gas, was cited as the main reason for the initiative (Chemical Market Reporter, 2003a).

Foreign Trade

U.S. soda ash export data for 2003 from the U.S. Census Bureau were compared with trade statistics from the Journal of Commerce's Port Import-Export Reporting Service and information provided by the industry. The variability was about 2% among the three data sources. Exports of 4.45 Mt, which was a record high, represented about 42% of U.S. soda ash production in 2003.

In 2003, U.S. exports to 41 countries, on a regional basis, were as follows: Asia, 35%; North America and South America, 22% each; Europe, 12%; the Middle East, 4%; Oceania, 3%; Africa, 2%; and Central America and the Caribbean, less than 1% each (table 5). The average free-alongside-ship value was \$115.61 per metric ton in 2003 compared with \$117.65 per ton in 2002. Although the data in tables 1 and 6 are rounded to three significant digits, the unit values shown are based on the actual unrounded statistics and not the rounded data. The top 10 countries, which represented 65% of total U.S. soda ash exports, in decreasing order and percentage of total were: Mexico, 13%; Canada and Japan, 8% each; Brazil, 7%; China, 6%; Belgium, Indonesia, and the Republic of Korea, 5% each; and Chile and Argentina, 4% each. About 59% of all U.S. soda ash exports went through the Columbia-Snake River customs district; the Laredo, TX, customs district was the second largest, with 13% of the total (table 5). Exports to Canada increased because of the closure of Canada's only soda ash plant in Amherstburg, Ontario.

IMC announced in January 2002 that it planned to withdraw from ANSAC effective January 1, 2004, because ANSAC has a 2-year exit clause. IMC reportedly lost some of its domestic sales in California and the Southwest and decided that it would concentrate its effort in 2003 to identify customers for export sales to Mexico and Central America because it is the only producer close to West Coast ports (Industrial Minerals, 2003b).

In 2003, imports of soda ash decreased by 44% to 5,000 t. The majority of imports historically came from Canada, where General Chemical (Soda Ash) Partners operated a synthetic soda ash plant in Amherstburg until April 2001. The facility produced dense soda ash and light soda ash, the majority of which was light soda ash exported to the United States. About 40% of soda ash imports was from the United Kingdom, and 28% was from Mexico. The remainder of imports were from Belgium, Bulgaria, China, Germany, India, Italy, Japan, Romania, Sweden, Switzerland, and Turkey. The average customs-insurance-freight value of imported soda ash was \$283.20 per ton, and the customs value was \$223.34 per ton.

World Review

Soda ash is a mature commodity in which consumption tends to grow proportional to population and gross domestic product growth rates. For this reason, the largest customers of soda ash were, for the most part, developed nations that have lower growth rates compared with developing countries. The less developed nations tend to have higher soda ash demands and higher growth rates (table 8). Although the production and consumption quantities varied among the countries, the end-use patterns were basically the same, and glass, chemicals, and detergents were the major sectors.

Nine countries had the capacity to produce more than 1 million metric tons per year (Mt/yr). They were, in descending order, China, the United States, Russia, India, Germany, France, Italy, Poland, and the United Kingdom. Bulgaria, Romania, and Ukraine had production installations that were rated at about 1 Mt/yr; adverse economic conditions, however, caused these nations to produce below their design capacities. Recent acquisitions or joint ventures with major European soda ash producers that have soda ash manufacturing expertise should reverse this situation in the next few years. In 2003, world soda ash production was estimated to be 37.8 Mt, which was a 2% increase compared with that of 2002.

China.—Zhejiang Glass Co., which was the fifth largest float glass manufacturer in China, began constructing a \$96.6 million synthetic soda ash plant in Haixi, Qinghai Province. When completed in late 2004, the plant's capacity will be 600,000 t/yr. The company plans to expand the facility to 900,000 t/yr and to build a second 600,000-t/yr plant; no date, however, was announced for these projects (Asian Chemical News, 2003).

Kazakhstan.—A contract was signed in March between JSC Sary-Tas and BVT of Turkey to construct a soda ash facility at the former Karatau chemical plant site in Taraz City in Zhambyl oblast. BVT will invest \$120 million in the project with the Government providing some guarantees. The plant will have a capacity of 200,000 t/yr that will serve 37 different customers in the country. The raw materials, salt and limestone, will come from Sorkol Lake, which is 60 kilometers (km) from Karatau, and from Aktau, which is 8 km from the plant, respectively (Trona Patch Times, 2003a).

Mexico.—Minera MGM SA de CV (a wholly owned subsidiary of Morgain Minerals Inc. of Toronto, Ontario, Canada, and Productos Quimicos Roda SA de CV of Torreon, State of Coahuila) formed the joint-venture company Tronamex SA de CV on July 31, 2002. The company planned to develop the Adair trona deposit in Sonora, which is about 20 km north of Puerto Penasco on the

east coast of the Sea of Cortez. A trona product known as Tronamex®, which is an animal feed additive, will be harvested by using solar evaporation of sodium sesquicarbonate-bearing brines and open pit mining of a shallow trona bed that ranges from 0.3 to 2.0 meters (m) thick. The trona will be used for dairy cattle as a rumen buffer, which aids in the digestion and increases milk yield. Sodium bicarbonate, trona, and refined trona are already used for this application in the United States. The company mined and processed 175 t of Tronamex® by the end of June 2003, and 165 t in July (Morgain Minerals, Inc., 2003§). The status of the project was uncertain by the end of the year (Industrial Minerals, 2003d).

Netherlands.—Brunner Mond (UK) Ltd. announced that when Akzo Nobel NV closes its Delfzijl chlorine plant in January 2004, the caustic carbonization part of the soda ash complex will be terminated. The majority of the plant that uses the typical ammonia-soda process will not be affected. The facility had a capacity of 400,000 t/yr (Industrial Minerals, 2003e).

Turkey.—In April, Rio Tinto Industrial Minerals Group acquired a 40-year operating license for the Kazan trona project. The deposit contains about 607 Mt of identified resources with an average grade of 31% trona. It is located 35 km northwest of Ankara and has 12 trona beds that vary in depth from 420 m in the northwest to 850 m in the southeast. The trona will be solution mined by using directional horizontal drilling technology to establish communication between the injection well and the production well. Beginning in 2004, Rio Tinto will start a 3-year pilot project to prove the viability of solution mining. Small-scale production will begin in 2007 with startup of a 900,000-t/yr soda ash plant scheduled for 2011 (Industrial Minerals, 2003c).

Outlook

After surpassing the United States as the world's largest soda ash producer, China continues to add new capacity and is increasing existing capacity at several of its plants. The U.S. soda ash industry will continue to encounter intense competition from China in some of the Asian markets. The rapid growth in Chinese general trade that resulted in a surge in demand for ocean freighters caused charter rates and freight costs to increase substantially in 2003.

Three dominant groups have survived to become the world leaders in soda ash—Solvay S.A. of Belgium, ANSAC of the United States, and China. In years to come, these three soda ash suppliers will produce and export soda ash to many customers all over the world. Because the glass container sector is the largest soda ash-consuming sector, the demand for soda ash for glass containers may decline as consumers slowly accept their food and beverages packaged in the newer polyethylene terephthalate containers.

The outlook for U.S. soda ash producers for the next 5 years is optimistic despite growing competition with China. Domestic soda ash consumption is expected to increase about 0.5% per year. World soda ash consumption is forecast to increase 2.0% to 2.5% per year for the next several years with Asia and South America being the likeliest areas for increased consumption in the near future.

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TABLE 1
SALIENT SODA ASH STATISTICS¹

(Thousand metric tons and thousand dollars except average annual value)

	1999	2000	2001	2002	2003
United States:					
Production ²	10,200	10,200	10,300	10,500	10,600
Value ²	\$779,000	\$748,000	\$773,000	\$784,000	\$765,000
Value, average annual:					
Per short ton	\$69.11	\$66.23	\$67.79	\$68.00	\$65.21
Per metric ton	\$76.00	\$73.00	\$74.73	\$74.96	\$71.88
Production, Wyoming trona	15,900	15,700	15,400	15,100	15,500
Exports	3,620	3,900	4,090	4,250	4,450
Value	\$447,000	\$477,000	\$487,000	\$500,000	\$515,000
Imports for consumption	92	75	33	9	5
Value	\$11,100	\$8,570	\$4,070	\$2,000	\$1,510
Stocks, December 31, producers'	248	245	226	222	330
Consumption:					
Apparent	6,740	6,430	6,310	6,250	6,090
Reported	6,430	6,390	6,380	6,430	6,270
World, production ^e	33,400 ^r	34,400 ^r	35,600 ^r	37,000 ^r	37,800

^eEstimated. ^rRevised.

¹Data are rounded to no more than three significant digits, except value per ton.

²Natural only; soda liquors and purge liquors are withheld to avoid disclosing company proprietary data.

TABLE 2
U.S. PRODUCERS OF SODA ASH IN 2003

(Million short tons unless otherwise noted)

Company	Plant nameplate capacity	Plant location	Source of sodium carbonate
American Soda, L.L.P. ¹	1.00	Parachute, CO	Underground nahcolite.
FMC Wyoming Corp.:			
Granger ²	1.30	Granger, WY	Underground trona.
Green River ³	3.55	Green River, WY	Do.
General Chemical (Soda Ash) Partners ⁴	2.80	do.	Do.
IMC Chemical Co. ⁵	1.45	Trona, CA	Dry lake brine.
OCI Chemical Corp. ⁶	3.10	Green River, WY	Underground trona.
Solvay Chemicals, Inc. ⁷	2.80	do.	Do.
Total	16.00		
Total million metric tons	14.50		

¹Came onstream October 2000. A joint venture with Williams Sodium Products Co., which is a wholly owned subsidiary of The Williams Companies, Inc. (60%) and American Alkali, Inc. (40%). Operation sold to Solvay America, Inc. September 10, 2003.

²Tg Soda Ash Inc. was sold to FMC Wyoming Corp. in July 1999.

³Formed joint venture (20%) in February 1996 with Sumitomo Corp. and Nippon Sheet Glass Co., Ltd., both of Japan.

⁴A joint venture between General Chemical Corp. (51%), Owens-Illinois, Inc. [acquired Australian Consolidated Industries International (ACI) in 1998] (25%), and Tosoh Wyoming Inc. of Japan (24%), which purchased part of ACI's share in June 1992. An expansion was completed in 1998.

⁵IMC Global, Inc. acquired North American Chemical Co. in April 1998; operation renamed.

⁶Rhône-Poulenc Basic Chemicals Co. of France sold its 51% share to Oriental Chemical Industries Chemical Corp. (OCI) of the Republic of Korea on February 29, 1996; Anadarko Petroleum Corp., (acquired Union Pacific Resources Co. in 2000) owns 49%. An 800,000-short-ton expansion, brought onstream in November 1998, increased plant capacity to 3.1 million short tons; however, the company planned to take 900,000 short tons out of service temporarily for equipment refurbishment.

⁷Solvay Soda Ash Joint Venture is owned by Solvay S.A. of Belgium (80%) and Asahi Glass Co. of Japan (20%), which became a partner in February 1990. Capacity increase of 272,000 metric tons (300,000 short tons) installed December 1995 and 454,000 metric tons (500,000 short tons) in October 2000. Company name changed to Solvay Chemicals, Inc. in 2003.

TABLE 3
REPORTED CONSUMPTION OF SODA ASH IN THE UNITED STATES, BY END USE, BY QUARTERS¹

(Thousand metric tons)

SIC code	End use	2002	2003				Total
			First quarter	Second quarter	Third quarter	Fourth quarter	
32	Glass:						
3221	Container	1,560	391	410	398	378	1,580
3211	Flat	1,100	262	265	275	261	1,060
3296	Fiber	273	66.6	64.2	66.6	71.3	269
3229	Other	231	52.8	49.3	44.5	49.3	196
	Total	3,170	773	789	784	759	3,100
281	Chemicals	1,670	425	446	428	427	1,730
284	Soaps and detergents	733	180	153	175	166	674
26	Pulp and paper	104	27.5	29.9	30.2	26.3	114
2899	Water treatment ²	87.7	17.0	20.6	17.2	15.6	70.4
	Flue gas desulfurization	123	31.7	30.6	33.0	28.5	124
	Distributors	315	69.6	67.6	70.9	68.7	277
	Other	225	52.5	40.0	40.3	47.3	180
	Total domestic consumption ³	6,430	1,580	1,580	1,580	1,540	6,270
	Exports ⁴	3,760	1,050	1,100	1,040	1,130	4,320
	Canada	368	90.1	81.4	73.5	74.3	319
	Total industry sales ⁵	10,200	2,620	2,680	2,620	2,670	10,600
	Total sales from plants	10,600	2,620	2,710	2,650	2,680	10,700
	Total production	10,500	2,580	2,680	2,680	2,700	10,600

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes soda ash equivalent from soda liquors and purge liquors sold to powerplant for water treatment. Sales of mine water are excluded.

³Imports reported by the producer/importer have been distributed into appropriate end-use categories listed above.

⁴As reported by producers. Includes Canada. Data may not necessarily agree with that reported by the U.S. Census Bureau for the same periods.

⁵Represents soda ash from domestic origin (production and inventory changes) and imports and for exports. Includes soda ash sold by coproducers and distributed by purchasers into appropriate end-use categories.

TABLE 4
SODA ASH YEAREND PRICES

(Dollars per short ton)

	2002	2003
Sodium carbonate (soda ash):		
Dense, 58% Na ₂ O 100-pound, paper bags, carlot, works, free on board	100.00-125.00	150.00-153.00
Bulk, carlot, same basis, tons	120.00-130.00	120.00-132.00
Light 58% 100-pound, paper bags, carlot same basis	180.00-220.00	186.00-210.00
Bulk, carlot, same basis, tons	173.00	174.00

Sources: Current prices of chemicals and related materials, Chemical Market Reporter, v. 263, no. 1, January 6, 2003, p. 23, and v. 265, no. 1, January 5, 2004, p. 19.

TABLE 5
REGIONAL DISTRIBUTION OF U.S. SODA ASH EXPORTS, BY CUSTOMS DISTRICTS, IN 2003¹

(Metric tons)

Customs districts	North America	Central America	South America	Caribbean	Europe	Middle East	Africa	Asia	Oceania	Total	Percentage of total
Atlantic:											
Baltimore, MD	--	--	--	--	1,580	--	--	--	--	1,580	(2)
Miami, FL	--	77	4	29	--	--	--	--	--	110	(2)
New York, NY	--	--	--	--	83	--	--	4	--	87	(2)
Norfolk, VA	--	--	--	--	69	--	--	--	--	69	(2)
Philadelphia, PA	--	--	--	--	65	--	--	--	--	65	(2)
Gulf:											
Houston-Galveston, TX	--	26	223	--	676	--	--	--	--	924	(2)
Port Arthur, TX	--	2,000	255,000	5,920	23,700	--	69,800	--	--	357,000	8
Pacific:											
Anchorage, AK	88	--	--	--	--	--	--	--	--	88	(2)
Columbia-Snake River	--	17,500	380,000	--	487,000	172,000	--	1,440,000	104,000	2,610,000	59
Los Angeles, CA	--	10,500	286,000	--	19,800	--	--	97,300	27,600	441,000	10
San Diego, CA	731	10,100	45,400	--	11,400	--	--	--	--	67,700	2
San Francisco, CA	--	--	--	--	--	--	--	150	--	150	(2)
Seattle, WA	10,800	--	--	--	--	--	--	9	--	10,800	(2)
North Central:											
Chicago, IL	--	--	--	--	--	--	--	45	--	45	(2)
Detroit, MI	287,000	--	--	--	78	--	--	--	--	287,000	6
Duluth, MN	532	--	--	--	--	--	--	--	--	532	(2)
Great Falls, MT	36,900	--	--	--	--	--	--	--	--	36,900	1
Pembina, ND	8,630	--	--	--	--	--	--	--	--	8,630	(2)
Northeast:											
Buffalo, NY	8,170	--	--	--	--	--	--	--	--	8,170	(2)
Ogdensburg, NY	164	--	--	--	227	--	--	--	--	391	(2)
St. Albans, VT	672	--	--	--	--	--	--	--	--	672	(2)
Southwest, Laredo, TX	600,000	--	--	--	--	--	--	--	--	600,000	13
Other, St. Louis, MO	9	--	--	--	--	--	--	--	--	9	(2)
Unknown	25,200	--	--	--	--	--	--	--	--	25,200	1
Total	978,000	40,300	967,000	5,950	545,000	172,000	69,800	1,540,000	132,000	4,450,000	100
Percentage of total	22	1	22	(2)	12	4	2	35	3	100	XX

XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 6
U.S. EXPORTS OF SODA ASH, BY COUNTRY¹

Country	2002			2003		
	Quantity (thousand metric tons)	Value ² (thousands)	Unit value	Quantity (thousand metric tons)	Value ² (thousands)	Unit value
Argentina	128	\$20,100	\$157	162	\$21,300	\$132
Australia	84	10,300	122	117	13,400	115
Bahamas, The	--	--	--	(3)	13	720
Belgium	126	17,200	136	245	30,000	123
Belize	--	--	--	(3)	8	430
Brazil	303	45,400	150	312	43,600	139
Canada	461	36,100	78	378	28,900	76
Chile	171	24,700	145	200	28,600	143
China	306	25,500	83	280	21,900	78
Colombia	84	15,400	184	114	19,600	171
Costa Rica	14	2,420	173	15	2,840	186
Ecuador	11	1,840	167	20	3,710	190
Finland	(3)	11	315	(3)	17	250
France	57	5,260	92	55	5,120	93
Germany	(3)	16	401	(3)	21	640
Guatemala	17	2,910	171	17	3,030	173
Indonesia	230	28,700	125	242	28,600	118
Italy	19	2,160	114	(3)	42	251
Japan	431	48,800	113	337	38,100	113
Korea, Republic of	206	23,600	114	203	22,200	109
Malaysia	107	15,300	143	103	13,600	132
Mexico	637	70,400	111	600	68,700	114
Netherlands	(3)	20	347	80	9,680	121
Netherlands Antilles	--	--	--	(3)	4	385
New Zealand	20	2,380	119	15	1,650	110
Nigeria	7	686	98	3	350	102
Panama	6	930	155	8	1,340	178
Peru	14	2,250	160	21	3,070	149
Philippines	62	7,670	124	67	8,260	122
Portugal	26	2,830	109	22	2,330	107
Russia	1	77	77	2	205	111
Saudi Arabia	106	8,950	84	128	10,900	85
South Africa	32	4,000	125	66	8,160	123
Spain	39	4,210	108	135	14,600	109
Taiwan	169	19,000	112	150	16,700	112
Thailand	145	18,300	126	145	17,000	117
Trinidad and Tobago	11	1,820	166	6	901	152
United Arab Emirates	32	2,660	83	44	3,650	83
United Kingdom	12	1,470	122	6	703	112
Venezuela	160	25,300	158	138	19,700	144
Vietnam	15	1,500	100	15	2,220	149
Total	4,250	500,000	118	4,450	515,000	116

-- Zero.

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Free alongside ship value.

³Less than 1/2 unit.

Source: U.S. Census Bureau, as adjusted by the U.S. Geological Survey using data and information from the Journal of Commerce Port Import-Export Reporting Service and industry sources.

TABLE 7
U.S. PRODUCTION OF SODIUM COMPOUNDS, BY MONTH¹

(Thousand metric tons)

	2002		2003	
	Soda ash	Wyoming trona ²	Soda ash	Wyoming trona ²
January	856	1,430	867	1,470
February	775	1,210	820	1,240
March	885	1,370	897	1,410
April	829	1,300	872	1,320
May	917	1,330	926	1,340
June	842	1,130	878	1,110
July	898	956	923	1,110
August	895	1,260	888	1,110
September	853	1,260	869	1,300
October	870	1,150	913	1,390
November	877	1,310	860	1,250
December	963	1,460	925	1,450
Total	10,500	15,100	10,600	15,500

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes solution-mined trona.

TABLE 8
SODA ASH: ESTIMATED WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	1999	2000	2001	2002	2003
Australia	300	300	300	300	300
Austria	150	150	150	150	150
Bosnia and Herzegovina	15	15	15	15	15
Botswana	234 ³	191 ³	251 ³	283 ^{r, 3}	285
Brazil	200	200	200	200	200
Bulgaria	800	800	800	800	800
Canada	300	300	300	300	300
China	7,654 ³	8,343 ³	9,144 ³	10,330 ^{r, 3}	11,075 ³
Egypt	50	50	50	50	50
Ethiopia	4 ^{r, 3}	4 ^{r, 3}	8 ^{r, 3}	8 ^r	8
France	1,000	1,000	1,000	1,000	1,000
Germany	1,400	1,400	1,400	1,400	1,400
India	1,500	1,500	1,500	1,500	1,500
Iran	146 ³	120 ^r	120 ^r	120 ^r	120
Italy	1,000	1,000	1,000	1,000	1,000
Japan	722 ³	669 ³	461 ^{r, 3}	460 ^r	460
Kenya ⁴	246 ³	238 ³	298 ³	304 ^{r, 3}	350
Korea, Republic of	310	310	310	310	310
Mexico	290	290	290	290	290
Netherlands	400	400	400	400	400
Pakistan	230	230	230 ^r	230	230
Poland	910 ^{r, 3}	1,018 ^{r, 3}	1,062 ^{r, 3}	1,054 ^{r, 3}	1,000
Portugal	150	150	150	150	150
Romania	550	550	560	550	500
Russia	1,918 ³	2,199 ³	2,370	2,400	2,400
Spain	500	500	500	500	500
Taiwan	140	140	140	140	140
Turkey	620	620	640	600	600
Ukraine	460 ³	500	650	678	650
United Kingdom	1,000	1,000	1,000	1,000	1,000
United States ⁴	10,200 ³	10,200 ³	10,300 ³	10,500 ³	10,600 ³
Total	33,400 ^r	34,400 ^r	35,600 ^r	37,000 ^r	37,800

^rRevised.

¹World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through April 18, 2004. Synthetic unless otherwise specified.

³Reported figure.

⁴Natural only.